PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-328050

(43)Date of publication of application : 10.12.1993

(51)Int.Cl. H04N 1/04
H04N 1/04
G03B 27/50
G05D 3/00
G06F 15/64

(21)Application number : 04-158810

(22)Date of filing : 26.05.1992

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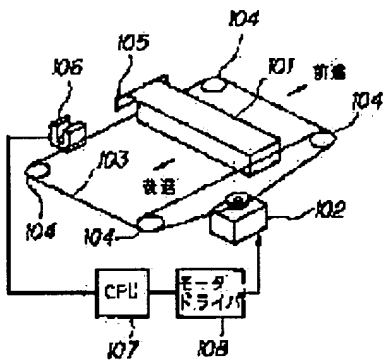
(54) IMAGE READER

(57)Abstract:

PURPOSE: To improve the accuracy of an image reading starting position and the position of a read image by the position detection means of easy constitution by controlling the reference position of an optical scanning means to be the same position with an original reading starting position.

CONSTITUTION: This image reader consists of a carriage 101 moves back and forth by integrally composing respective parts to optically read an original image, a pulse motor 102 driving it, a flag 105 being the detected part of positional detection, which is provided for the carriage 101, a sensor 106 detecting it, CPU 107 controlling the whole image reader and a motor driver 108 driving the pulse motor 102. The pulse motor 102 is used for the driving system of the carriage 101 (an optical scanning system), a single sensor 106 (positional detection means) execute the positional detection of the carriage 101 and the reference position by the positional detection is set to be a reading starting position. Thus, the accuracy of the image reading starting position and the position of the read image can be improved at low cost.



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CLAIMS

[Claim(s)]
[Claim 1] The image reader characterized by to provide an optical scan means to scan a manuscript optically, the driving means which carries out both-way migration of said optical scan means, a single location detection means detect the location of said optical scan means, and the control means which controls the criteria location of said optical scan means as the same location as a manuscript reading starting position.
[Claim 2] The image reader which carries out [providing an optical scan means scan a manuscript optically, the driving means which carry out the both-way migration of said optical scan means, a location detection means detect the location of the optical scan means which arranged said optical scan means possible / passage /, and the control means which judge the abnormalities of a main scanning direction in an inclination to the direction of an optical scan means of vertical scanning in case said optical scan means passes said location detection means, and] as the description.
[Claim 3] The image reader according to claim 2 characterized by making into a manuscript reading starting position the criteria location of said location detection means by which said optical scan means can be passed.
[Claim 4] While being arranged by an optical scan means to scan a manuscript optically, the driving means which carries out both-way migration of said optical scan means, a single location detection means to detect the location of said optical scan means, and said optical scan means A detected means by which the configuration which will be in the condition of not detecting in case said location detection means is passed was prepared in pars intermedia, The image reader characterized by providing the control means which judges the abnormalities in an inclination of a main scanning direction to the direction of vertical scanning of said optical scan means in case said detected means passes said location detection means.

[Claim 5] An optical scan means to scan a manuscript optically, and the driving means which carries out both-way migration of said optical scan means, A single location detection means to detect the location of said optical scan means, and a storage means of a non-volatile to memorize the criteria set point, The image reader characterized by providing the control means which judges the abnormalities [as opposed to the direction of vertical scanning of said optical scan means for the abnormalities of the inclination of a main scanning direction to the direction of vertical scanning of said optical scan means] in an inclination of a main scanning direction as compared with the criteria set point of said storage means.
[Claim 6] An optical scan means to scan a manuscript optically, and the driving means which carries out both-way migration of said optical scan means, A location detection means to detect the location of said optical scan means, and a sensor migration means to make at least one of said the location detection means reciprocate in said optical scan means and this direction, The image reader characterized by providing the control means which performs

criteria position control of said optical scan means based on the detection output of said location detection means which reciprocates with said sensor migration means.

[Translation done.]

PCL XL error

Subsystem: KERNEL

Error: IllegalOperatorSequence

Operator: 0x1b

Position: 661

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the image reader which detects the inclination (squareness) of said optical scan means while performing position control of an optical scan means with a single location detection means in a detail more about image readers, such as a digital copier, facsimile, and an image scanner, at high degree of accuracy.
[0002]
[Description of the Prior Art] Conventionally, in the image reader which drives an optical scan system (carriage) by the pulse motor as shown in drawing 1 , after performing a shading compensation in advance of reading of a manuscript, an optical scan system stops to a manuscript reading starting position, and it stands by until there is a reading initiation instruction from a host computer or image recording equipment (henceforth a host). And if an instruction of a host is received, an optical scan system will be operated. By the way, as a result of measuring the amount of displacement of the optical scan system at this time using a laser displacement gage, the amount of displacement at the time of actuation initiation of an optical scan system and an actuation halt became clear [that it is an excessive response as shown in drawing 14 and drawing 15]. In this case, especially as for an optical scan system, the image with which it was crushed in the direction of vertical scanning since there was little movement magnitude will be outputted at the time of actuation initiation. In order to solve this, entrance length was prepared in the optical scan system, and it was supported. In addition, generally, a pulse motor is excellent in location precision, and is used for the above image readers from the revolution initial state into the self-starting frequency range as a motor in which a constant-speed revolution is possible.
[0003] As reference technical reference relevant to this invention, there is a "image reader" currently indicated by JP,3-65098,A, and this "image reader" establishes the detection means single at an edge on the other hand within the predetermined section when an optical scan system reciprocates, and controls the pulse motor which is the driving means of said optical scan system based on the output of this detection means.
[0004]
[Problem(s) to be Solved by the Invention] However, since entrance length was prepared in an optical scan system in order not to make the image crushed in the above-mentioned direction of vertical scanning output, if it is in the conventional image reader as shown above, and it corresponded, there was a trouble of the location precision of a manuscript reading starting position falling. Moreover, in the image reader which an optical scan system needs to suspend in an image reading field by incremental actuation etc., the location precision at the time of re-actuation of an optical scan system had similarly the trouble of being low.
[0005] Moreover, in the conventional image reader, although the location precision of an optical scan system is raised with the location detection means, in order to read an image to

high degree of accuracy, as for the optical scan system, the main scanning direction must be held to the direction of vertical scanning (the migration direction) at the right angle. However, if it was in the conventional image reader, since there was no means to judge said squareness currently held, decision of an operator had to be entrusted even if the squareness to the direction of vertical scanning of the optical scan system resulting from a certain external factor and aging was spoiled. For this reason, the abnormality image was outputted and there was a trouble of inviting breakage of equipment further.

[0006] This invention is made in view of the above, and let it be the 1st object to raise the location precision of an image reading starting position and a reading image with the easy location detection means of a configuration.

[0007] Moreover, this invention sets it as the 2nd object to enable decision of the squareness to the direction of vertical scanning of an optical scan system with the easy location detection means of a configuration.

[0008]

[Means for Solving the Problem] This invention offers the image reader possessing an optical scan means scan a manuscript optically, the driving means which carries out both-way migration of said optical scan means, a single location detection means detect the location of said optical scan means, and the control means which controls the criteria location of said optical scan means as the same location as a manuscript reading starting position, in order to attain the above-mentioned object.

[0009] Moreover, the image reader possessing an optical scan means scan a manuscript optically, the driving means which carry out the both-way migration of said optical scan means, a location detection means detect the location of the optical scan means which arranged said optical scan means possible [passage], and the control means which judge the abnormalities of a main scanning direction in an inclination to the direction of vertical scanning of an optical scan means in case said optical scan means passes said location detection means provides. Moreover, it is desirable to make into a manuscript reading starting position the criteria location of said location detection means by which said optical scan means can be passed.

[0010] Moreover, while being arranged by an optical scan means to scan a manuscript optically, the driving means which carries out both-way migration of said optical scan means, a single location detection means to detect the location of said optical scan means, and said optical scan means A detected means by which the configuration which will be in the condition of not detecting in case said location detection means is passed was prepared in pars intermedia, In case said detected means passes said location detection means, the image reader possessing the control means which judges the abnormalities in an inclination of a main scanning direction to the direction of vertical scanning of said optical scan means is offered.

[0011] Moreover, an optical scan means to scan a manuscript optically and the driving means which carries out both-way migration of said optical scan means, A single location detection means to detect the location of said optical scan means, and a storage means of a non-volatile to memorize the criteria set point, The image reader possessing the control means which judges the abnormalities [as opposed to the direction of vertical scanning of said optical scan means for the abnormalities of the inclination of a main scanning direction to the direction of vertical scanning of said optical scan means] in an inclination of a main scanning direction as compared with the criteria set point of said storage means is offered.

[0012] Moreover, an optical scan means to scan a manuscript optically and the driving means which carries out both-way migration of said optical scan means, A location detection means to detect the location of said optical scan means, and a sensor migration means to make at least one of said the location detection means reciprocate in said optical scan means and this direction, Based on the detection output of said location detection means which reciprocates with said sensor migration means, the image reader possessing the control means which

performs criteria position control of said optical scan means is offered.
[0013]
[Function] The image reader by this invention controls the criteria location of an optical scan means by the control means as the same location as a manuscript reading starting position.
[0014] Moreover, by the control means, the image reader by this invention judges the abnormalities in an inclination of a main scanning direction to the direction of vertical scanning of an optical scan means, in case an optical scan means passes a location detection means.
[0015]
[Example] [Example 1] One example of this invention is hereafter explained with reference to an accompanying drawing. Drawing 1 is the explanatory view showing the outline configuration of the image reader by this invention. In drawing, in order that 101 may read a manuscript image optically, the carriage which constitutes each part article in one and reciprocates, and 102 are the pulse motors used as the driving source which drives carriage 101, and the wire 103 is wound around the output shaft. Moreover, another side of a wire 103 has engaged with carriage 101, and the wire 103 is laid by the pulley 104 arranged fixed. Moreover, the sensor using the photo interrupter etc. in order that the flag with which 105 becomes the detected part of the location detection prepared in carriage 101, and 106 might detect a flag 105, CPU (microcomputer) to which 107 performs control of the whole image reader, and 108 are Motor Driver which drives a pulse motor 102.
[0016] Moreover, drawing 2 is the explanatory view showing the configuration of carriage 101, and this carriage 101 consists of CCD (charge-coupled device) image-sensors 203 grades of a double adhesion mold, such as carrying out photo electric translation of said reflected light to the fluorescent lamp 201 which illuminates the manuscript for reading, and the rod-lens array 202 which carries out image formation of the reflected light of a manuscript to the 203rd page of the CCD series as follows. In addition, in drawing 2 , L1 is the distance from the image reading station of CCD series 203 to the back end (retreat side) of a flag 105, L2 is the distance from the image reading station of CCD series 203 to the head (advance side) of a flag 105, and it is respectively set as predetermined distance.
[0017] Moreover, drawing 3 is the explanatory view showing each physical relationship in the migration section of the carriage 101 of the image reader by this invention. In addition, let the location of the carriage 101 in this example be the image reading station of CCD series 203. Moreover, since a sensor detection location turns into a criteria location at the time of positioning of carriage 101 and this criteria location makes it into a reading starting position, the distance of a sensor location and a reading starting position must be L1.
[0018] Moreover, it needs to be referred to as L3<L2 when distance of a carriage back marginal location and a sensor location is set to L3. In the return actuation to the home position of Power ON and the carriage 101 after reset, when a sensor 106 is in the condition (henceforth an OFF condition) that carriage 101 is not detected, if this is L3<L2, it should just carry out back (retreat) actuation of the carriage 101 until it will be in the detection condition (henceforth, ON condition) of a sensor 106. This will continue retreat, without stopping, even if carriage 101 serves as a back marginal location, when carriage 101 is back to a sensor 106 in the above condition noting that it is L3>L2, and when the worst, since there is a possibility of damaging equipment, it considers it. After carriage 101 starts actuation, it is necessary to make distance L4 of a reading position in readiness and a reading starting position into sufficient entrance length to become constant-speed motion.
[0019] Actuation of the image reader constituted as mentioned above is explained. the home-position return operation of the carriage 101 according [drawing 4] to this invention -- it is the flow chart which shows an example. In drawing, the detection condition of whether a sensor 106 is in ON condition is judged first (S401), when a sensor 106 is in ON condition, carriage 101 is advanced (S402), the location (manuscript reading starting position) turned off is judged

(S403), and carriage 101 is stopped (S406). On the other hand, in the above-mentioned step 401, when a sensor 106 is in an OFF condition, carriage 101 is retreated (S404), the location (manuscript reading starting position) where the sensor 106 was turned on is judged (S405), and carriage 101 is stopped (S406). Then, only the distance L5 from said halt location to a home position retreats (S407).

[0020] In addition, in the above, the distance to which carriage 101 progresses is easily computable from the distance to which the carriage 101 per step of a pulse motor 102 progresses. Moreover, since positioning actuation of the above-mentioned carriage 101 has a transient response at the time of actuation initiation of carriage 101, and a halt, it cannot say it as exact positioning strictly. However, in order to make a criteria location into the manuscript reading starting position at the time of reading a manuscript in the case of the image reader by this example, the location precision of a home position does not become coarse with trouble at all somewhat at actual manuscript reading processing.

[0021] Next, manuscript reading actuation is explained. Drawing 5 is a flow chart which shows the manuscript reading actuation by this invention. In addition, although an image reader operates based on the input of the command signal from a host, it is usually omitted by this example. In drawing 5 , only the distance of L5-L4 advances carriage 101 (S501), and shading compensation processing is performed (S502). Next, when it judges whether it is a reading position in readiness (S503) and carriage 101 serves as a reading position in readiness, it is made to stop (S504), and (a pulse motor 102 is stopped) it stands by until there is an instruction from a host.

[0022] Next, if it judges whether the instruction of manuscript reading initiation was inputted from the host (S505) and an instruction of manuscript reading initiation is inputted from a host, advance of carriage 101 is started (S506), it will judge that the sensor 106 was turned off (S507), and the output of image data will be started from this OFF location (S508). Then, if the output of image data is performed to a manuscript reading termination location (S509) and it becomes a manuscript reading termination location, return actuation to the home position of carriage 101 will be performed (S510), and image reading actuation will be ended.

[0023] Therefore, since according to this example explained above a pulse motor 102 is used for the drive system of carriage 101 (optical scan system), location detection of carriage 101 is performed by the single sensor 106 (location detection means) and the criteria location by this location detection is made into the reading starting position, it is low cost and the location precision of an image reading starting position and a reading image can be raised.

[0024] [Example 2] Drawing 6 shows the example 2 by this invention, and is the top view of the carriage 101 section of an image reader, and the sensor 106 section. In drawing, a pulse motor 102 is used as a driving source of carriage 101. If carriage 101 moves in the direction with a sensor 106, carriage 101 will be detected when a flag 105 covers the optical path of a sensor 106. At this time, the vertical-scanning lay length of a flag 105 is detectable by counting the number of steps of the pulse motor 102 taken to turn off a sensor 106 from ON.

[0025] In addition, it is highly precise, and in order to detect, it is desirable to drive carriage 101 with constant speed. However, in order to detect the vertical-scanning lay length of this flag 105, the sense of the direction of vertical scanning of a flag 105 needs to be making the right angle to the laser beam of a sensor 106. In this invention, angle-of-inclination theta of a main scanning direction to the direction of vertical scanning of carriage 101 is detected using the relation of the laser beam of the flag 105 formed in carriage 101 in this way, and a sensor 106.

[0026] Detection of above-mentioned angle-of-inclination theta is explained in full detail. A flag 105 sets the sense of the laser beam of a sensor 106 as parallel in parallel to the direction of vertical scanning in a main scanning direction. At this time, L6 and a pulse motor 102 set to x distance in which carriage 101 progresses the die length of a flag 105 to per step, and as a known number defined beforehand, while a sensor 106 is turned off from ON, the number of

steps which the pulse motor 102 required is set to N. Angle-of-inclination theta of a main scanning direction to the direction of vertical scanning of the carriage 101 in this case is called for by the degree type.
Theta=COS -1 (x.N-/L6)
[0027] When the value of theta becomes more than constant value by making into a decision value angle-of-inclination theta called for by the above, it is judged as the error (abnormal condition) of the carriage 101 section, and a signal to that effect is outputted. Thus, since the condition before resulting in breakage generating of equipment is detected while preventing generating of an abnormality image (image crushing), breakage generating can be beforehand prevented with an easy configuration.
[0028] In addition, in this example, although the pulse motor 102 was used as a driving means of carriage 101, if detection of the die length of a detected material while the sensor 106 was turned off from ON is possible, even if it will use other driving sources, it can ask for angle-of-inclination theta similarly. For example, when a servo motor is used for the driving source of carriage 101, the constant speed drive of the carriage 101 is carried out at the time of detection, and said angle-of-inclination theta can be found by t, then the degree type on the conditions which possess timer ability in CPU107 in time amount until v and a sensor 106 are turned off from ON in the passing speed of carriage 101.
Theta=COS -1 (v.t-/L6)
[0029] Moreover, although the location of a sensor 106 may be moved to anywhere if it is in the successive range of carriage 101, by, for example, performing criteria positioning so that it may become the manuscript reading starting position of carriage 101, only for said judgment, it becomes unnecessary to extend a sensor 106 and reduction of the part cost can be aimed at.
[0030] [Example 3] Next, an example 3 is explained. The outline configuration of the image reader of this example presupposes that it is the same as that of the above-mentioned example 1. However, the configuration of the flag 105 of carriage 101 is set up like drawing 7 . That is, a sensor 106 makes carriage 101 a configuration (the notching part L7 is formed) which will once be in the condition of not detecting in the medium of a flag 105 here. In this example, angle-of-inclination theta of a main scanning direction to the direction of vertical scanning of carriage 101 is judged like the case of the above-mentioned example 2, in case the part of L6 of a flag 105 passes a sensor 106. In addition, detection of angle-of-inclination theta is possible also in the notching part L7.
[0031] If a sensor 106 once detects a flag 105 in the condition of carriage 101 in the image (there is no notching part L7) reader with which position control of carriage 101 is generally performed by the single sensor 106 as the above-mentioned example 1 explained, and the configuration of a flag 105 will not be in the condition of not detecting, only like a rectangle in medium and it is turned on, even if it will retreat more than this, a sensor 106 does not serve as OFF. It is for preventing that the edge of the flag 105 of the front section of carriage 101 is back to a sensor 106 in the case of home-position return actuation of the carriage 101 after the power source ON of equipment, and reset etc. when the output of the beginning of a sensor 106 is in an OFF condition.
[0032] On the other hand, in the image reader of this example, in order to perform position control of carriage 101 and to judge the inclination of the main scanning direction to the direction of vertical scanning of carriage 101 by the single sensor 106, the configuration of a flag 105 is constituted, as shown in drawing 7 .
[0033] Actuation of this example is explained in the above configuration. Drawing 8 is a flow chart which shows actuation of the example 3 by this invention. In drawing, first, the detection condition of a sensor 106 is judged (S801), if it is in ON condition, only the distance of L1+L2 will advance carriage 101 (S802), and a flag 105 will be thoroughly moved to the front to a sensor 106. Next, carriage 101 is retreated until a sensor 106 will be in ON condition (S803),

and it judges that the sensor 106 was turned on (S804), and, in ON, carriage 101 is stopped in this ON location (S805). Then, further, only the distance of L5 retreats carriage 101 and is returned to a home position.

[0034] On the other hand, in the above-mentioned step 801, if a sensor 106 is in an OFF condition, only the distance of carriageL7 will retreat 101 (S807). Then, the detection condition of a sensor 106 is judged again (S808), and if it is in ON condition, actuation of step 802 will be performed. Moreover, if it is in an OFF condition, actuation after step 803 will be performed and carriage 101 will be returned to a home position.

[0035] In the above, it performs that only the distance of carriageL7 retreats 101 when a sensor 106 is in an OFF condition first in order to identify the case where the non-detecting part (notching part L7) of a flag 105 is located in the detection location of a sensor 106, and the case where the flag 105 is ahead located to the detection location of a sensor. However, in order that carriage 101 may not cross a back marginal location at this time, the conditions of L2>L3>L7 (at however, the time of L1<L6 L2>L 3> (L6-L1+L7x2)) and L9>L7 shall be fulfilled.

[0036] Therefore, as explained above, while forming the single sensor 106 which detects the location of carriage 101 according to this example A non-detecting part (notching part L7) is prepared in the medium of the flag 105 of carriage 101. That detection of said flag 105 is possible, or the abnormalities [as opposed to / in case a flag 105 passes a sensor 106 / the direction of vertical scanning of carriage 101] of the inclination of a main scanning direction by CPU107 In order to judge, the number of sensors of the whole equipment is minimum-ized, judges the above-mentioned abnormal condition of carriage 101 by an easy configuration and control, and becomes possible [reporting that to an operator].

[0037] [Example 4] Drawing 9 is the block diagram of the control system in the image reader in which the example 4 by this invention is shown. In drawing, RAM [read-out / 901 / RAM / the writing of the data outputted from CPU107 and read-out], and 902 are the cells used as the backup power supply of RAM901, when equipment is a power source OFF. Moreover, the same functional element as what was shown in drawing 1 in other parts has attached the sign shown in drawing 1 .

[0038] Actuation of the control system constituted as mentioned above is explained. Beforehand, two kinds of actuation, initialization action mode and normal operation mode, is enabled at this equipment, and to the direction of vertical scanning, the main scanning direction of carriage 101 performs an initialization action, when right-angled. At the time of initialization action mode, the number of steps of a pulse motor 102 at the time of a flag 105 passing a sensor 106 is counted, and the number of counts is written in RAM901. Moreover, the data written in RAM901 are read at the time of normal operation mode, and it asks for angle-of-inclination theta of a main scanning direction to the direction of vertical scanning of carriage 101 while counting the number of steps of the pulse motor 102 at the time of a flag 105 passing a sensor 106.

[0039] Above-mentioned angle-of-inclination theta can ask for the number of steps of the pulse motor 102 at the time of initialization by the degree type, when the number of steps of the pulse motor 102 at the time of A and normal operation is set to B.

Theta=COS -1 (B/A)

It judges by CPU107 whether the value of this angle-of-inclination theta exceeded to the default value set up beforehand, and an error output to that effect is performed.

[0040] Therefore, as explained above, an effective judgment can be performed as the components precision and assembly precision which be used for location detection of carriage 101 be coarse in order according to this example to include RAM901 of a non-volatile in a control system and to perform the abnormality judging of the inclination of a main scanning direction to the direction of vertical scanning of carriage 101 by the comparison with the information at the time of initialization, and the cost at the time of manufacture of equipment

can be reduced.
[0041] [Example 5] Drawing 10 is the explanatory view showing the outline configuration of the image reader which is the example 5 by this invention. 1001 is the location detection means of carriage 101, and a pulley for the pulse motor to which the sensor using the photo interrupter constituted movable in carriage 101 and this direction and 1002 drive a sensor 1001 based on the control signal from CPU107, Motor Driver to which 1003 drives a pulse motor 1002, the wire laid by 1004 stopping a sensor 1001, and 1005 to make a wire 1004 laying with fixed tension, and 1006 are the flags for criteria location detection of a sensor 1001. Moreover, the same functional element as what was shown in drawing 1 in other parts has attached the sign shown in drawing 1 .
[0042] Moreover, drawing 11 is the explanatory view showing each physical relationship within the migration section of the carriage 101 and the sensor 1001 which are the example 5 by this invention. Moreover, drawing 12 is the explanatory view showing the configuration of the carriage 101 in this example. In this equipment, the back end section of a flag 1005 is installed due to L13>L2 so that it may not lap with a flag 105. Moreover, the front marginal location of a sensor 1001 is further located ahead rather than the back end section of a flag 1006. And if distance from the back end section of a flag 1006 to the front marginal location of a sensor 1001 is set to L11, the relation of L10>L11>L6 is filled. Moreover, when a sensor 1001 is in a back marginal location, since it becomes undetectable, a flag 105 is set as the relation of L18>L17. Furthermore, it is set as the relation of L15>L18.
[0043] In the case of the image reader in this example, it is necessary to move carriage 101 and a sensor 1001 to a criteria location at the time of a power source ON etc. In the above configuration, the return actuation to the home position of the carriage 101 by this example is explained. Drawing 13 is a flow chart which shows actuation by this example. In drawing, the detection condition of a sensor 1001 is judged (S1301), first, if it is in an OFF condition, advance actuation will be performed (S1302), and a sensor 1001 is advanced to the location turned on (S1303). On the other hand, if a sensor 1001 is in ON condition in step 1301, retreat actuation is performed (S1304), a sensor 1001 judges whether it is OFF (S1305), and carriage 101 will be stopped if it judges that it is OFF (S1306).
[0044] Next, when the condition of a sensor 1001 is judged (S1309) and this sensor 1001 is set to OFF before advancing the sensor 1001 (S1307) and progressing the distance of L6 (S1308), after performing step 1303 or actuation of S1306, actuation when a sensor 1001 is OFF first because of the condition of having detected the flag 105 is repeated. In addition, x in step 1308 is a distance to which a sensor 1001 progresses in the state of ON.
[0045] When L6 carries out distance advance and a sensor 1001 does not change into an OFF condition in step 1308, it means, as for a sensor 1001, detecting a flag 1006 on the other hand. Here, a sensor 1001 is retreated (S1310), the detection condition of a sensor 1001 is judged (S1311), and a sensor 1001 is suspended in the location (back end of a flag 1005) turned off at this time (S1312). And this halt location is determined as the criteria location of a sensor 1001. Next, only the distance of a sensorL14 retreats 1001 from this distance (S1313). Then, while a sensor 1001 retreats, it judges by CPU107 whether a sensor 1001 is turned on (S1314). When a sensor 1001 is turned on during retreat, in order to mean detecting a flag 105, carriage 101 will be ahead located to a sensor 1001. ON condition of a sensor 1001 is again judged in this condition (S1315), and if it is ON, only L6 will advance carriage 101 (S1316).
[0046] Moreover, in step 1314, when a sensor 1001 does not detect a flag 105 during retreat, since [to require] it is back located to a sensor 1001, carriage 101 performs advance (S1317) of carriage 101 until a sensor 1001 is turned on (S1318). It is made to move forward until OFF will come, if turned on at this time (S1319), and carriage 101 is stopped (S1320). In this condition, since it is ahead located rather than the detection location of a sensor 1001, a flag 105 retreats carriage 101 (S1321), and it retreats and it is stopped until a sensor 1001 serves

as ON (S1322) (S1323). Only the distance of L15-L18 retreats carriage 101 from this location (S1324). The retreated this location is the home position of carriage 101. Then, only a sensorL16 moves forward (S1325) (detection location of the point of the flag 105 in case carriage 101 is a manuscript reading starting position), and 1001 equips reading processing of a manuscript with it.

[0047] That the sensor 1001 should just be beforehand located ahead [L2] from the convention location of carriage 101 when performing position control of carriage 101 by the sensor 1001 during manuscript reading, when carriage 101 halts during manuscript reading, when the sensor 1001 is located ahead [of the halt location of carriage 101 / L2] and detects the point of a flag 105 beforehand, carriage 101 is stopped, and the output of image data is also suspended. Moreover, again, in beginning to read a manuscript, carriage 101 is retreated once, after giving entrance length so that it may become constant speed, actuation is started, and after a sensor 1001 detects carriage 101 again, it outputs image data.

[0048] Therefore, since the carriage drive system which it is [drive system] in a successive range and makes carriage 101 reciprocate, the sensor 1001 which detects the location of carriage 101, and this sensor 1001 were formed in carriage 101 and this direction for the movable sensor drive system according to this example as explained above, in a halt and the image reader made to re-drive, the position control of high degree of accuracy becomes possible about carriage 101 in manuscript reading fields, such as incremental actuation. Moreover, in order to perform such actuation by detection of the single sensor 1001, the number of sensors for location detection of the whole equipment can be reduced, and it is economical.

[0049]

[Effect of the Invention] An optical scan means to scan a manuscript optically according to the image reader by this invention as explained above, Since the driving means which carries out both-way migration of said optical scan means, a single location detection means to detect the location of said optical scan means, and the control means which controls the criteria location of said optical scan means as the same location as a manuscript reading starting position were provided, With the easy location detection means of a configuration, the location precision of an image reading starting position and a reading image can be raised.

[0050] Moreover, an optical scan means to scan a manuscript optically according to the image reader by this invention, The driving means which carries out both-way migration of said optical scan means, and a location detection means to detect the location of the optical scan means which arranged said optical scan means possible [passage], Since the control means which judges the abnormalities in an inclination of a main scanning direction to the direction of vertical scanning of an optical scan means was provided when said optical scan means passed said location detection means, decision of the squareness to the direction of vertical scanning of an optical scan system is attained with the easy location detection means of a configuration.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Industrial Application] This invention relates to the image reader which detects the inclination (squareness) of said optical scan means while performing position control of an optical scan means with a single location detection means in a detail more about image readers, such as a digital copier, facsimile, and an image scanner, at high degree of accuracy.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] Conventionally, in the image reader which drives an optical scan system (carriage) by the pulse motor as shown in drawing 1 , after performing a shading compensation in advance of reading of a manuscript, an optical scan system stops to a manuscript reading starting position, and it stands by until there is a reading initiation instruction from a host computer or image recording equipment (henceforth a host). And if an instruction of a host is received, an optical scan system will be operated. By the way, as a result of measuring the amount of displacement of the optical scan system at this time using a laser displacement gage, the amount of displacement at the time of actuation initiation of an optical scan system and an actuation halt became clear [that it is an excessive response as shown in drawing 14 and drawing 15]. In this case, especially as for an optical scan system, the image with which it was crushed in the direction of vertical scanning since there was little movement magnitude will be outputted at the time of actuation initiation. In order to solve this, entrance length was prepared in the optical scan system, and it was supported. In addition, generally, a pulse motor is excellent in location precision, and is used for the above image readers from the revolution initial state into the self-starting frequency range as a motor in which a constant-speed revolution is possible.
[0003] As reference technical reference relevant to this invention, there is a "image reader" currently indicated by JP,3-65098,A, and this "image reader" establishes the detection means single at an edge on the other hand within the predetermined section when an optical scan system reciprocates, and controls the pulse motor which is the driving means of said optical scan system based on the output of this detection means.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] An optical scan means to scan a manuscript optically according to the image reader by this invention as explained above, Since the driving means which carries out both-way migration of said optical scan means, a single location detection means to detect the location of said optical scan means, and the control means which controls the criteria location of said optical scan means as the same location as a manuscript reading starting position were provided, With the easy location detection means of a configuration, the location precision of an image reading starting position and a reading image can be raised.
[0050] Moreover, an optical scan means to scan a manuscript optically according to the image reader by this invention, The driving means which carries out both-way migration of said optical scan means, and a location detection means to detect the location of the optical scan means which arranged said optical scan means possible [passage], Since the control means which judges the abnormalities in an inclination of a main scanning direction to the direction of vertical scanning of an optical scan means was provided when said optical scan means passed said location detection means, decision of the squareness to the direction of vertical scanning of an optical scan system is attained with the easy location detection means of a configuration.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, since entrance length was prepared in an optical scan system in order not to make the image crushed in the above-mentioned direction of vertical scanning output, if it is in the conventional image reader as shown above, and it corresponded, there was a trouble of the location precision of a manuscript reading starting position falling. Moreover, in the image reader which an optical scan system needs to suspend in an image reading field by incremental actuation etc., the location precision at the time of re-actuation of an optical scan system had similarly the trouble of being low.
[0005] Moreover, in the conventional image reader, although the location precision of an optical scan system is raised with the location detection means, in order to read an image to high degree of accuracy, as for the optical scan system, the main scanning direction must be held to the direction of vertical scanning (the migration direction) at the right angle. However, if it was in the conventional image reader, since there was no means to judge said squareness currently held, decision of an operator had to be entrusted even if the squareness to the direction of vertical scanning of the optical scan system resulting from a certain external factor and aging was spoiled. For this reason, the abnormality image was outputted and there was a trouble of inviting breakage of equipment further.
[0006] This invention is made in view of the above, and let it be the 1st object to raise the location precision of an image reading starting position and a reading image with the easy location detection means of a configuration.
[0007] Moreover, this invention sets it as the 2nd object to enable decision of the squareness to the direction of vertical scanning of an optical scan system with the easy location detection means of a configuration.

[Translation done.]

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MEANS

[Means for Solving the Problem] This invention offers the image reader possessing an optical scan means scan a manuscript optically, the driving means which carries out both-way migration of said optical scan means, a single location detection means detect the location of said optical scan means, and the control means which controls the criteria location of said optical scan means as the same location as a manuscript reading starting position, in order to attain the above-mentioned object.
[0009] Moreover, the image reader possessing an optical scan means scan a manuscript optically, the driving means which carry out the both-way migration of said optical scan means, a location detection means detect the location of the optical scan means which arranged said optical scan means possible [passage], and the control means which judge the abnormalities of a main scanning direction in an inclination to the direction of vertical scanning of an optical scan means in case said optical scan means passes said location detection means provides. Moreover, it is desirable to make into a manuscript reading starting position the criteria location of said location detection means by which said optical scan means can be passed.
[0010] Moreover, while being arranged by an optical scan means to scan a manuscript optically, the driving means which carries out both-way migration of said optical scan means, a single location detection means to detect the location of said optical scan means, and said optical scan means A detected means by which the configuration which will be in the condition of not detecting in case said location detection means is passed was prepared in pars intermedia, In case said detected means passes said location detection means, the image reader possessing the control means which judges the abnormalities in an inclination of a main scanning direction to the direction of vertical scanning of said optical scan means is offered.
[0011] Moreover, an optical scan means to scan a manuscript optically and the driving means which carries out both-way migration of said optical scan means, A single location detection means to detect the location of said optical scan means, and a storage means of a non-volatile to memorize the criteria set point, The image reader possessing the control means which judges the abnormalities [as opposed to the direction of vertical scanning of said optical scan means for the abnormalities of the inclination of a main scanning direction to the direction of vertical scanning of said optical scan means] in an inclination of a main scanning direction as compared with the criteria set point of said storage means is offered.
[0012] Moreover, an optical scan means to scan a manuscript optically and the driving means which carries out both-way migration of said optical scan means, A location detection means to detect the location of said optical scan means, and a sensor migration means to make at least one of said the location detection means reciprocate in said optical scan means and this direction, Based on the detection output of said location detection means which reciprocates with said sensor migration means, the image reader possessing the control means which performs criteria position control of said optical scan means is offered.

OPERATION

[Function] The image reader by this invention controls the criteria location of an optical scan means by the control means as the same location as a manuscript reading starting position. [0014] Moreover, by the control means, the image reader by this invention judges the abnormalities in an inclination of a main scanning direction to the direction of vertical scanning of an optical scan means, in case an optical scan means passes a location detection means.

[Translation done.]

JAPANESE [JP,05-328050,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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EXAMPLE

[Example] [Example 1] One example of this invention is hereafter explained with reference to an accompanying drawing. Drawing 1 is the explanatory view showing the outline configuration of the image reader by this invention. In drawing, in order that 101 may read a manuscript image optically, the carriage which constitutes each part article in one and reciprocates, and 102 are the pulse motors used as the driving source which drives carriage 101, and the wire 103 is wound around the output shaft. Moreover, another side of a wire 103 has engaged with carriage 101, and the wire 103 is laid by the pulley 104 arranged fixed. Moreover, the sensor using the photo interrupter etc. in order that the flag with which 105 becomes the detected part of the location detection prepared in carriage 101, and 106 might detect a flag 105, CPU (microcomputer) to which 107 performs control of the whole image reader, and 108 are Motor Driver which drives a pulse motor 102.
[0016] Moreover, drawing 2 is the explanatory view showing the configuration of carriage 101, and this carriage 101 consists of CCD (charge-coupled device) image-sensors 203 grades of a double adhesion mold, such as carrying out photo electric translation of said reflected light to the fluorescent lamp 201 which illuminates the manuscript for reading, and the rod-lens array 202 which carries out image formation of the reflected light of a manuscript to the 203rd page of the CCD series as follows. In addition, in drawing 2 , L1 is the distance from the image reading station of CCD series 203 to the back end (retreat side) of a flag 105, L2 is the distance from the image reading station of CCD series 203 to the head (advance side) of a flag 105, and it is respectively set as predetermined distance.
[0017] Moreover, drawing 3 is the explanatory view showing each physical relationship in the migration section of the carriage 101 of the image reader by this invention. In addition, let the location of the carriage 101 in this example be the image reading station of CCD series 203. Moreover, since a sensor detection location turns into a criteria location at the time of positioning of carriage 101 and this criteria location makes it into a reading starting position, the distance of a sensor location and a reading starting position must be L1.
[0018] Moreover, it needs to be referred to as L3<L2 when distance of a carriage back marginal location and a sensor location is set to L3. In the return actuation to the home position of Power ON and the carriage 101 after reset, when a sensor 106 is in the condition (henceforth an OFF condition) that carriage 101 is not detected, if this is L3<L2, it should just carry out back (retreat) actuation of the carriage 101 until it will be in the detection condition (henceforth, ON condition) of a sensor 106. This will continue retreat, without stopping, even if carriage 101 serves as a back marginal location, when carriage 101 is back to a sensor 106 in the above condition noting that it is L3>L2, and when the worst, since there is a possibility of damaging equipment, it considers it. After carriage 101 starts actuation, it is necessary to make distance L4 of a reading position in readiness and a reading starting position into sufficient entrance length to become constant-speed motion.
[0019] Actuation of the image reader constituted as mentioned above is explained. the home-

position return operation of the carriage 101 according [drawing 4] to this invention -- it is the flow chart which shows an example. In drawing, the detection condition of whether a sensor 106 is in ON condition is judged first (S401), when a sensor 106 is in ON condition, carriage 101 is advanced (S402), the location (manuscript reading starting position) turned off is judged (S403), and carriage 101 is stopped (S406). On the other hand, in the above-mentioned step 401, when a sensor 106 is in an OFF condition, carriage 101 is retreated (S404), the location (manuscript reading starting position) where the sensor 106 was turned on is judged (S405), and carriage 101 is stopped (S406). Then, only the distance L5 from said halt location to a home position retreats (S407).

[0020] In addition, in the above, the distance to which carriage 101 progresses is easily computable from the distance to which the carriage 101 per step of a pulse motor 102 progresses. Moreover, since positioning actuation of the above-mentioned carriage 101 has a transient response at the time of actuation initiation of carriage 101, and a halt, it cannot say it as exact positioning strictly. However, in order to make a criteria location into the manuscript reading starting position at the time of reading a manuscript in the case of the image reader by this example, the location precision of a home position does not become coarse with trouble at all somewhat at actual manuscript reading processing.

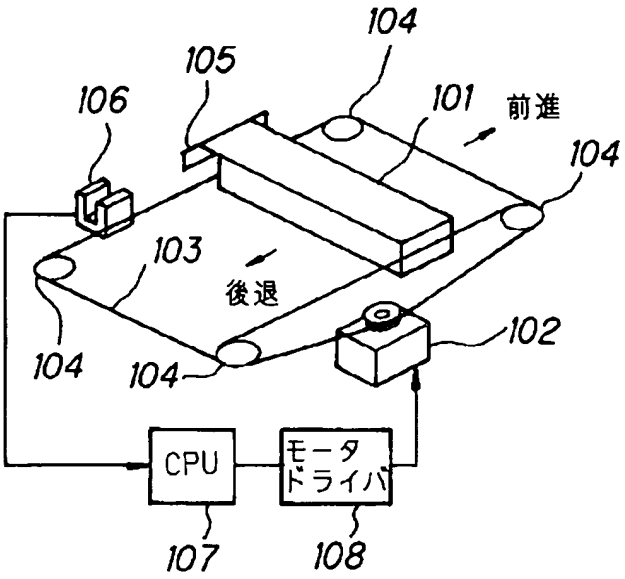
[0021] Next, manuscript reading actuation is explained. Drawing 5 is a flow chart which shows the manuscript reading actuation by this invention. In addition, although an image reader operates based on the input of the command signal from a host, it is usually omitted by this example. In drawing 5 , only the distance of L5-L4 advances carriage 101 (S501), and shading compensation processing is performed (S502). Next, when it judges whether it is a reading position in readiness (S503) and carriage 101 serves as a reading position in readiness, it is made to stop (S504), and (a pulse motor 102 is stopped) it stands by until there is an instruction from a host.

[0022] Next, if it judges whether the instruction of manuscript reading initiation was inputted from the host (S505) and an instruction of manuscript reading initiation is inputted from a host, advance of carriage 101 is started (S506), it will judge that the sensor 106 was turned off (S507), and the output of image data will be started from this OFF location (S508). Then, if the output of image data is performed to a manuscript reading termination location (S509) and it becomes a manuscript reading termination location, return actuation to the home position of carriage 101 will be performed (S510), and image reading actuation will be ended.

[0023] Therefore, according to this example explained above, a pulse motor 102 is used for the drive system of carriage 101 (optical scan system), and it is the single sensor 106.

[Translation done.]

Drawing selection Representative drawing



[Translation done.]

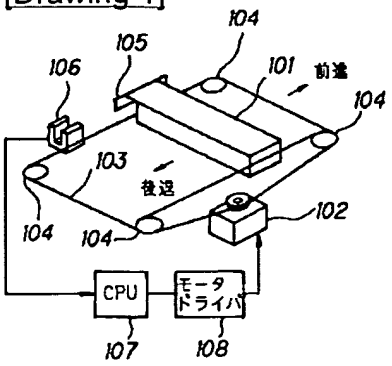
DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the explanatory view showing the outline configuration of the image reader by this invention.
[Drawing 2] It is the explanatory view showing the configuration of the carriage by this invention.
[Drawing 3] It is the explanatory view showing each physical relationship in the migration section of the carriage of the image reader by this invention.
[Drawing 4] the home-position return operation of the carriage by this invention -- it is the flow chart which shows an example.
[Drawing 5] It is the flow chart which shows actuation of the manuscript reading processing by this invention.
[Drawing 6] It is the top view in which showing the example 2 by this invention, and showing the carriage section and the sensor section of an image reader.
[Drawing 7] It is the explanatory view showing the flag of carriage and the relation of a sensor by this invention.
[Drawing 8] It is the flow chart which shows actuation of the example 3 by this invention.
[Drawing 9] It is the block diagram in which showing the example 4 by this invention, and showing the control system of an image reader.
[Drawing 10] It is the explanatory view in which showing the example 5 by this invention, and showing the outline configuration of an image reader.
[Drawing 11] It is the explanatory view showing each physical relationship within the migration section of the carriage and the sensor which are the example 5 by this invention.
[Drawing 12] It is the explanatory view showing the configuration of the carriage of the example 5 by this invention.
[Drawing 13] It is the flow chart which shows actuation by the example 5 by this invention.
[Drawing 14] It is the graph which shows the measurement result of the amount of carriage displacement (at the time of migration initiation).
[Drawing 15] It is the graph which shows the measurement result of the amount of carriage displacement (at the time of a migration halt).
[Description of Notations]
101 Carriage 102 Pulse Motor
105 Flag 106 Sensor
107 CPU 203 CCD Series
901 RAM 902 Cell
1001 Sensor 1002 Pulse Motor
1006 Flag

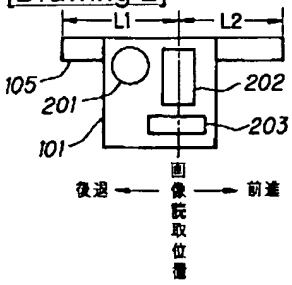
[Translation done.]

DRAWINGS

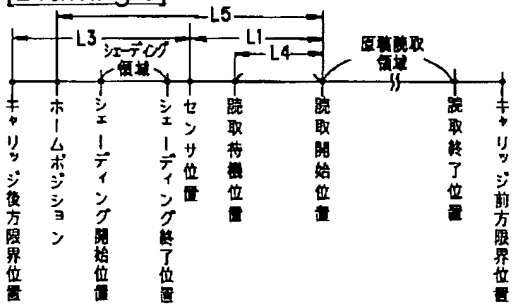
[Drawing 1]



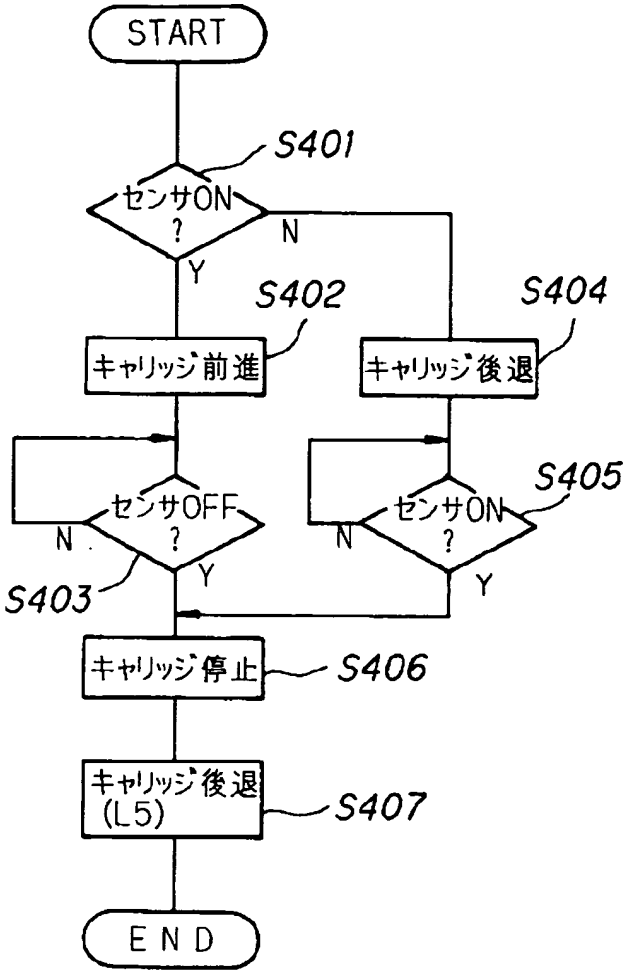
[Drawing 2]



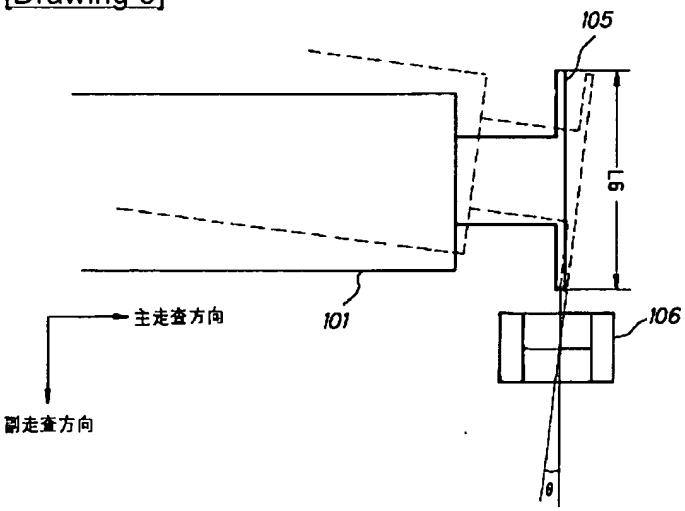
[Drawing 3]



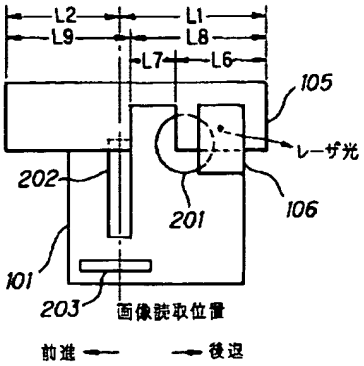
[Drawing 4]



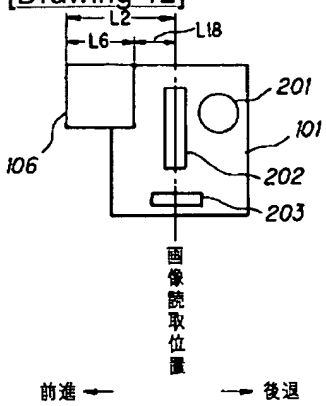
[Drawing 6]



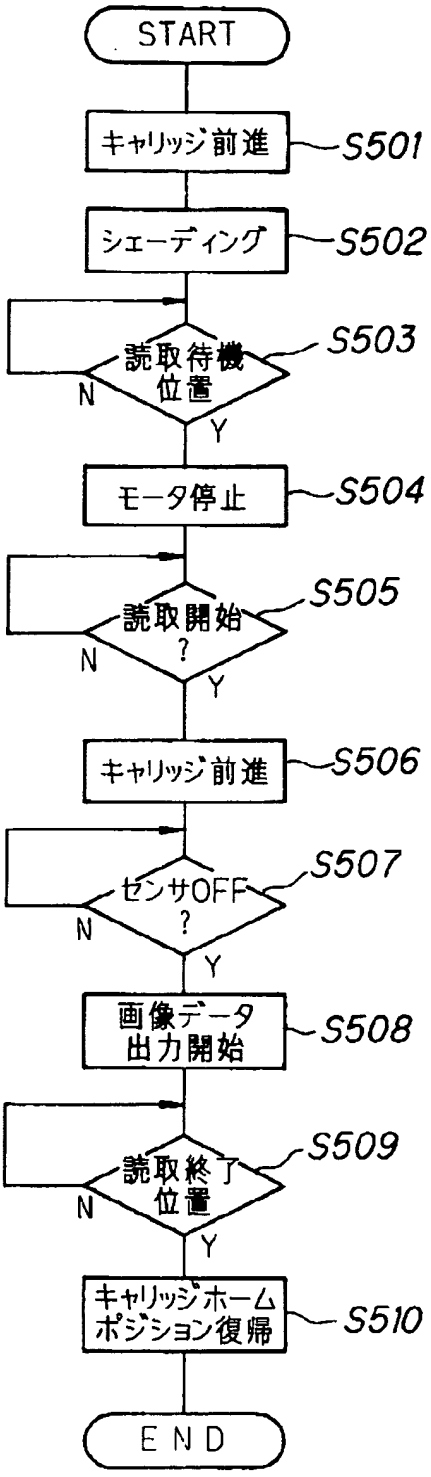
[Drawing 7]



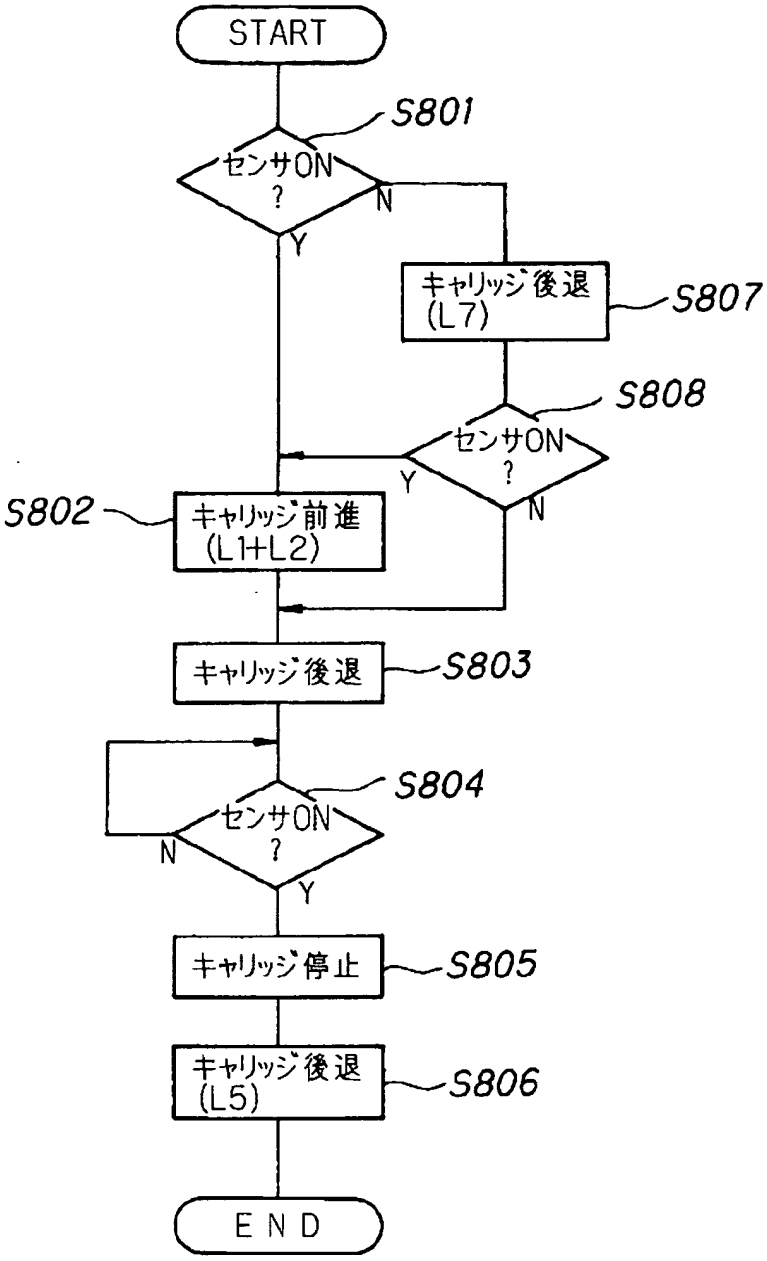
[Drawing 12]



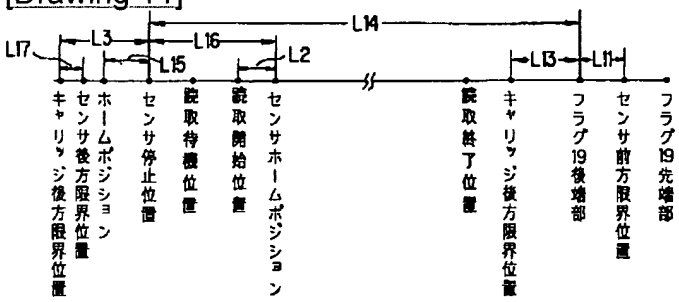
[Drawing 5]


START
キャリッジ前進
S501
シェーディング
S502
読取待機位置
S503
N
Y
モータ停止
S504
読取開始?
S505
N
Y
キャリッジ前進
S506
センサOFF?
S507
N
Y
画像データ出力開始
S508
読取終了位置
S509
N
Y
キャリッジホームポジション復帰
S510
END

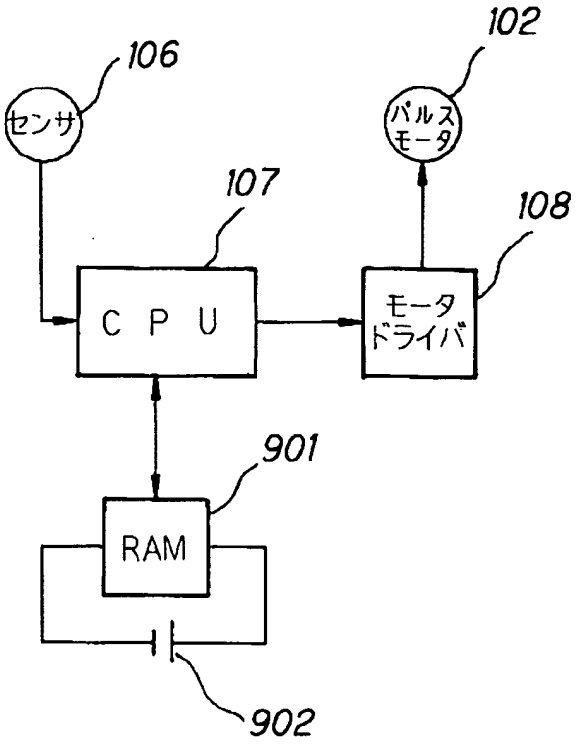
[Drawing 8]



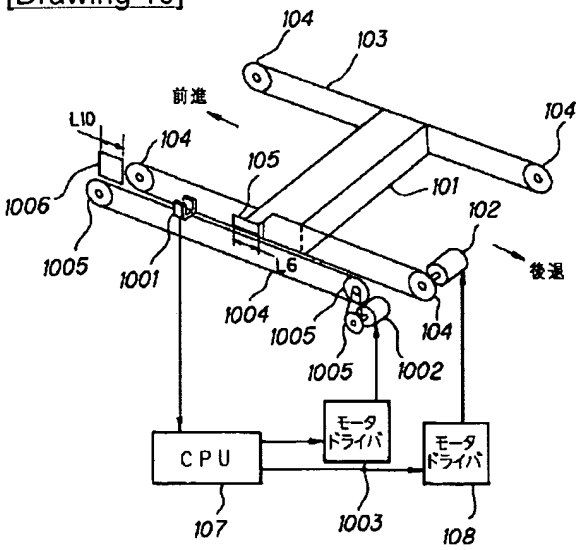
[Drawing 11]



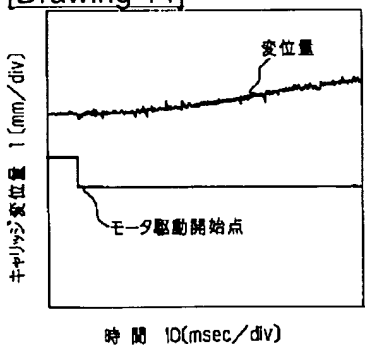
[Drawing 9]



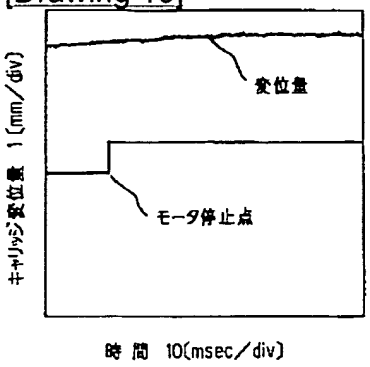
[Drawing 10]



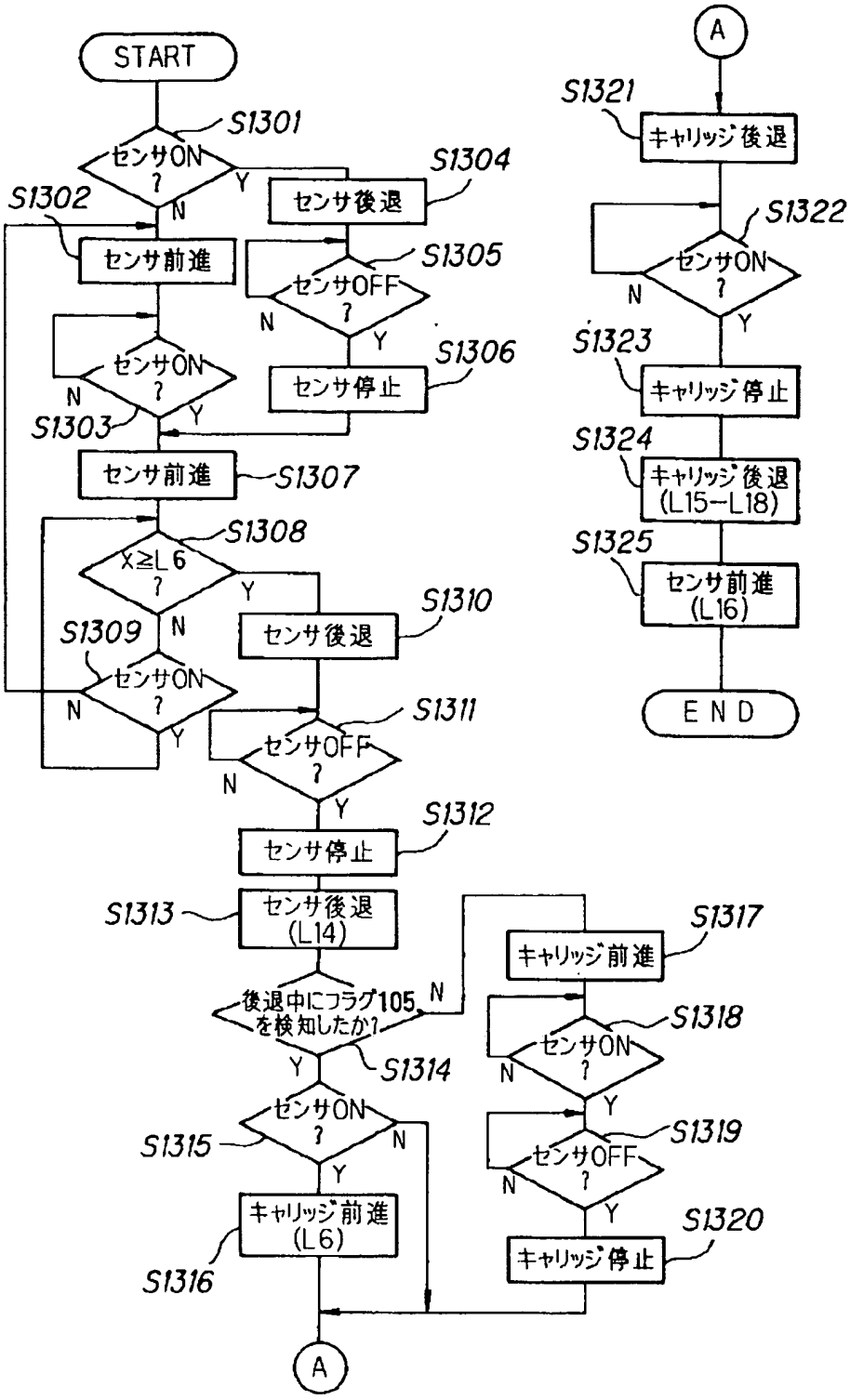
[Drawing 14]



[Drawing 15]



[Drawing 13]



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